

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-V (OLD) EXAMINATION – WINTER 2018****Subject Code:150904****Date: 11/12/2018****Subject Name: Elements Of Electrical Design****Time: 10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full mark.

- Q.1** (a) Explain the advantages & disadvantages of Lap & Wave winding. **07**  
(b) Explain the Direct-On-Line starter of induction motor with necessary wiring diagram. **07**
- Q.2** (a) Derive the necessary equation to calculate the resistance steps for D.C.Shunt Motor. **07**  
(b) Explain the different types of Iron losses. **07**
- OR**
- (b) Determine the MMF required for the air gap of a machine having the following data. **07**  
Core length=300 mm including 3 ducts of 10 mm width, pole arc=22 cm, slot pitch=6.0 cm, slot opening= 6 mm, flux per pole= 0.043 wb, length of air gap=0.5 cm, assume Carter's co-efficient of 0.18 and 0.28 for opening/gap 1 & 2 respectively.
- Q.3** (a) What is the basic function of electromagnet? List out the different types of Electromagnet. **07**  
(b) The starter of a 400 v dc series motor has 4 resistance section and the current limits during the starting are 100 A and 150 A. The resistance of the machine is  $0.2\Omega$  and between these current limits the flux changes by 9%. Determine the resistance of each section of starter. **07**
- OR**
- Q.3** (a) Explain the importance of dummy coil and equalizer connections in case of d.c. winding. **07**  
(b) Define Real & Apparent Flux Density. **07**
- Q.4** (a) What are the important factors while selecting the suitable size of conductor for industrial wiring? **07**  
(b) List out the different types of material used in Residential wiring. **07**
- OR**
- Q.4** (a) Explain the important basic equation in case of Electromagnet. **07**  
(b) Explain the design procedure of 1-phase Small Transformer. **07**
- Q.5** (a) Define following with refer to D.C.Arature Winding **07**  
(1) Front Pitch (2) Back-Pitch (3) Commutator Pitch (4) Pole-Pitch  
(b) Explain the design steps of welding transformer. **07**
- OR**
- Q.5** (a) Differentiate between integral and fractional slot winding & state advantages of fractional slot winding. **07**  
(b) Draw the Electrical wiring diagram of 7-hp induction motor considering the star-delta starter. **07**

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